

## Morphology of Aba Knife Fish (*Gymnarchus niloticus*) (Cuvier, 1829)

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**Abstract:** *Gymnarchus niloticus* is a fresh water fish belonging to the family Gymnarchidae. They are relatively very large fishes reaching lengths of 167cm. The frank fish has a long-slender body with scales which are not normally seen from afar. The dorsal fin is continuous starting behind the head and ending at the tail which is usually blunt. The caudal pelvic and anal fins are absent. They are found in Africa, precisely in the River Nile, Niger along dense vegetated River edges and swamps. These fishes are carnivorous feeding on crustaceans, insects including fishes smaller than themselves. They make use of an electric field for electrolocation of their prey and sometimes use it for navigation, usually to steer away from an obstruction. They spawn during high water season. Before they spawn, they build a nest made of plant fibres in which thousands of eggs are laid. The males are mouth brooders carrying the eggs in their mouth. They are usually very aggressive for them to be cultured with other species or even the co-species. So they are preferably cultured alone. Like every other fish they are also a source of protein. They command very high price and is usually used among the Ijebu's in Nigeria to present as a gift to the Bride's family during betrothal. *Gymnarchus niloticus* has the ability to grow very fast thus making it suitable for profitable culture.

**Key words:** Morphology • *Gymnarchus niloticus*

### INTRODUCTION

*Gymnarchus niloticus* (Cuvier, 1829) also known as trunk fish, also called Aba knife fish. It is a fresh water fish which can reach up to 167cm in length. It's a relatively large fish probably one of the largest knife fishes. It belongs to the family Gymnarchidae and it is the only living specie of this family. They are classified under the order Osteoglossidae (the bony tongued fishes). They are found in Africa and precisely in the river Nile, Niger, Volta, Kainji dam including the National institute of Fresh Water Research New Bussa. This fish moves very swiftly with the use of the fin on its dorsal side, this fin moves in an undulating manner providing the propelling force needed for this fish to move forward or backwards as the case may be [1]. They are also known to possess a streamlining that enables it to move with ease without much stress from surrounding water.

The main aim of this paper is to review the sexual differences between the female and male of this specie. Though the differences are not easily recognised due to the similarities between them. The structural design of the body and the mechanism of movement can be used to construct more streamlined ships and underwater vessels that use less energy [1].

**Biology:** The trunk fish possesses a long slender, eel-like body covered in small scales with no caudal, pelvic, or anal fin. The dorsal fin extends a little behind the head towards the rat like tail which is blunt at the end. This fish possesses a weak electric field which it uses for electrolocation including navigation. Some authorities think that the males might use it for stereotyped communication with the females for reproduction. This fish has a marked ability to avoid obstacles [2]. The hind end and particularly the finger like tail are known to contain tissues corresponding to an electric organ; this organ enables the animal to detect objects within its vicinity [2].

**Habitat:** They live mainly in swamps and vegetated river edges. They are also found to inhabit slow moving or stagnant water and backwater regions, among dense vegetations for ease of hiding during the day then come out night to hunt and other various kinds of cover.

**Feeding Habit:** *Gymnarchus niloticus* is generally carnivorous and piscivorous; feeding on crustaceans, insects and fish [3]. The young ones feed on insects and medium sized ones feed on a mixed diet of insects and fry of other fishes. The possession of a symmetrical electric



Plate 1: Showing Male and Female *Gymnarchus niloticus*

field helps for effective feeding through electrolocation [1]. The trunk fish makes its rat like tail to be negatively charged in respect to the positively charged head thus producing a symmetrical field that when a feeder fish comes along that path it distorts the field then making the trunk fish aware of it. It swallows the feeder fish in a gulp. *Gymnarchus niloticus* is very active at night, it is also a nocturnal hunter, hiding during the day and then coming out at night to hunt and feed.

**Breeding Behaviour:** *Gymnarchus niloticus* breeds in swamps during high water season. Before spawning begins, this fish builds a nest made of plant fibres in which thousands of eggs are laid each about 10mm in diameter. The male trunk fishes are mouth brooders; they carry the eggs in their mouth. The newly hatched young ones have long gill filaments and an elongate yolk sac, this yolk sac provides them with food for the length of time that it takes them to become young *Gymnarchus niloticus*, because at the stage when the yolk is still visible, they are still vulnerable and can't feed themselves [4]. The young ones usually come to the surface for air. The parental males defend the nest very aggressively and do not hesitate to attack human intruders.

**Culture of *Gymnarchus niloticus*:** *G. niloticus* is not for the average aquaculturist. Before trunk fish can be cultured, it is preferable that you start with a trunk fish of size not less than 3mm because the ones that are less than that size will be too weak and coupled with the fact that the ones with their yolk sac still showing are also very weak at this stage. The minimum amount of water needed to culture *G. niloticus* is between 909-1363 litres due to the fact that it is a big fish. Since it is also an aggressive fish so it is important that it is cultured alone. It is preferable

that the pH of the water should be slightly alkaline between 6.5-8.0 and a temperature of 23-28degrees Celsius. They preferably feed on live fishes like live Tilapia fishes but they could be made to feed on frozen fishes. Due to the fact that the fish grows rapidly thus to culture this peculiar fish you will need a large tank.

It has been recently discovered that Tilapia can be successfully cultured with *G. niloticus* because all that needs to be done is to feed the Tilapia with its food then due to tilapia's high proliferation rate, *G. niloticus* feeds on the fry of tilapia thus decreasing the cost of feeding *Gymnarchus niloticus*. Therefore Tilapia can be successfully polyculture with trunkfish in an earthen pond.

**Sexual Differences in *Gymnarchus niloticus*:** Indeed to identify the differences between male and female of this specie is not really established. From observation it is noticed that there are some observable differences in this fish relating to the sexes. The males are generally longer and slimmer than the females (Plate 1). From random study, the male was measuring 87cm and the female measuring 83cm in length. The females are wider than the males due to the fact that the females carry eggs in their abdomen.

**Economic Importance:** Like every other fish, it is a source of protein. It commands a very high price. They are given as one of the gifts from a suitor to the bride's family during betrothal. Known as "EJA OSAN" in Yoruba and as "DANSARKI" in Hausa (meaning son of a king) because it is highly regarded. It is relished when smoked. The body structure design of the fish can be used to construct more under water vessels & streamlined ones that use less energy [5]. This fish is really expensive and can cost as much as \$170 per fish.

In conclusion, the trunkfish is really an interesting species due to some of its morphological characteristics. Because of its size and it's no nonsense attitude it is really accorded with respect. It is normally said that no man is an island, but when relating with this fish it builds its island and doesn't entertain visitors, as long as it happens to have a constant supply of live feed it is sure to stay on its own. They can grow very fast thus making them suitable for profitable fish culture, therefore it is important to protect their habitat from overexploitation of their young ones.

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